

Amendments to the Drawings:

The attached drawing sheet includes changes to Figure 1. In Figure 1, labels are provided for blocks 1-7, as required by the Examiner.

REMARKS/ARGUMENTS

In the Office Action mailed August 1, 2008, claims 1-5 were rejected. In response, Applicants hereby request reconsideration of the application in view of the amendments and the below-provided remarks. No claims are added or canceled.

For reference, claims 1-5 are amended. It should be noted that these amendments are merely a matter of form and consistency. In particular, claim 1 is amended to separate elements by line indentations, and to revise the punctuation as required by the Examiner. Similarly, claim 2 is also amended to separate elements by line indentations, and to revise the punctuation as required by the Examiner. Claims 1-5 are also amended to use language more consistently. For example, claims 1 and 3-5 are amended to refer to the “polyphase group delay equalizers,” as initially recited in claim 1.

Objections to the Drawings

The Office Action states that Figure 1 should include labels for blocks 1-7. Although Applicants disagree that such labels might be required, for the reasons presented in Applicants’ previous responses, Figure 1 is amended to include labels for blocks 1-7 in order to advance prosecution of the present application. Accordingly, Applicants respectfully request that the objection to Figure 1 be withdrawn.

Objections to the Claims

The Office Action objects to claims 1-5 because of informalities. In particular, claims 1-5 are objected to for using commas to separate elements. Although the Examiner asserts that the claims must use semicolons to separate elements of the claims, there appears to be no statute or regulation to support this asserted requirement. Rather, 37 C.F.R. 1.75 merely states that claim elements should be separated by a line indentation. 37 C.F.R. 1.75(i). The term “should” is permissive and not mandatory, so there is no requirement to use line indentations to separate elements of a claim—the use of line indentations is merely recommended.

However, in the interest of advancing prosecution, Applicants submit that claims 1 and 2 are amended to separate elements by line indentations, as suggested in 37 C.F.R.

1.75(i). Also, claims 1 and 2 are amended to use semicolons, as recommended by the Examiner. Accordingly, Applicants respectfully request that the objections to claims 1-5 be withdrawn. Moreover, these amendments should be understood as merely a change in form, without affecting the substance of the subject matter recited in the claims.

Claim Rejections under 35 U.S.C. 103

Claims 1 and 3-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hajimiri et al. (U.S. Pat. Pub. No. 2002/0173337, hereinafter Hajimiri) in view of Cheung (U.S. Pat. No. 6,476,685, hereinafter Cheung) further in view of Chappell (U.S. Pat. No. 2002/0141494, hereinafter Chappell). Additionally, claim 2 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hajimiri in view of Cheung further in view of Chappell and further in view of Sempel et al. (U.S. Pat. No. 6,324,233, hereinafter Sempel). However, Applicants respectfully submit that these claims are patentable over Hajimiri, Cheung, Chappell, and Sempel for the reasons provided below.

Independent Claim 1

Claim 1 recites “the transfer function of the polyphase group delay equalizer has, for the frequency range of interest, one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane with the pole(s) and the zero(s) of said one or more pairs lying substantially symmetrically with respect to said positive imaginary axis, wherein the one or more pole-zero pairs are shifted along the positive imaginary axis off of the real axis of the complex frequency plane” (emphasis added).

In contrast, the combination of cited references does not teach all of the limitations of the claim. In particular, the combination of Hajimiri, Cheung, and Chappell does not teach a transfer function with one or more pole-zero pairs alongside of only the positive axis, and shifted along the positive imaginary axis off of the real axis, as recited in the claim. It should be noted that the Office Action acknowledges that Hajimiri does not teach the indicated limitation, and the Office Action does not rely on Chappell as addressing the indicated limitation. Hence, the Office Action relies on Cheung as purportedly teaching a transfer function with only one or more pole-zero pairs alongside of a positive imaginary axis of a complex frequency plane.

However, the assertion in the Office Action regarding the purported teachings of Cheung are insufficient to establish a *prima facie* rejection of the claim because the Office Action does not address the actual language of the claim. Additionally, the claim is patentable over Cheung because Cheung does not teach the indicated limitations.

1. The description of embodiments in the present application.

While the details of the specification are not read into the limitations of the claim, it may be useful to refer to the specification of the present application for a contextual understanding of the limitations recited in the claim. The specification of the present application describes a tuning arrangement for receiving a plurality of signal channels and tuning to a specific one of the signal channels. Page 1, lines 6-11. Embodiments of the tuning arrangement include a group delay equalizer to keep the group delay within certain limits. Page 1, lines 16-21.

Typically, conventional group delay equalizers have an all pass transfer function, with pole-zero pairs along both the positive imaginary axis and the negative imaginary axis, as shown in Fig. 1 below. In other words, the all pass transfer function of conventional group delay equalizers has a pole-zero pair along the positive imaginary axis (above the real axis) and another pole-zero pair along the negative imaginary axis (below the real axis). It should be noted that a similar illustration for a conventional all pass transfer function is also shown in Fig. 4B of Cheung.

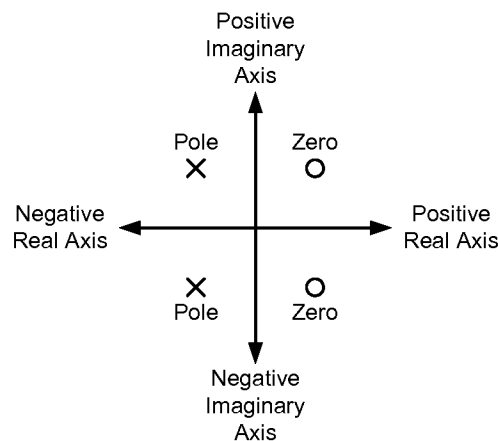


Fig. 1. Conventional All Pass Transfer Function with Pole-Zero Pairs along Both the Positive Imaginary Axis and the Negative Imaginary Axis.

In contrast to devices which use conventional group delay equalizers, embodiments described in the present application use a group delay equalizer (or a plurality of group delay equalizers) that has a transfer function which has a pole-zero pair along only the positive imaginary axis. Fig. 2 shown below illustrates a transfer function with a pole-zero pair along only the positive imaginary axis. Thus, the transfer function does not have a pole-zero pair along the negative imaginary axis (the area shown hashed below the real axis in Fig. 2). It should be noted that a similar illustration is shown in Fig. 3 of the present application.

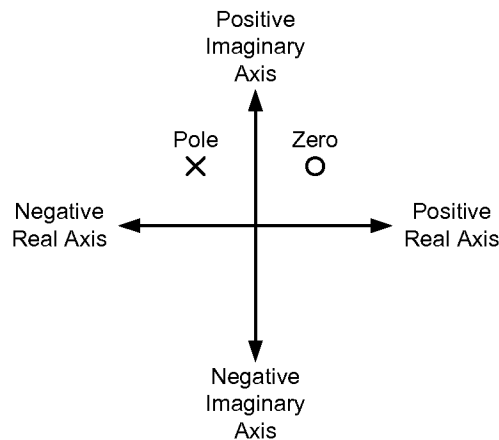


Fig. 2. Transfer Function with Pole-Zero Pair(s) along Only the Positive Imaginary Axis (no Pole-Zero Pair(s) along the Negative Imaginary Axis).

The specification of the present application also explains that the pole-zero pair(s) along the positive imaginary axis has a different affect than the pole-zero pair(s) along the negative imaginary axis. In particular, the equalizer group delay originating from the pole-zero pair(s) in the upper half of the complex frequency plane (i.e., along the positive imaginary axis) increases with increasing frequency and is, therefore, able to at least partly correct or equalize the group delay variations of an intermediate frequency (IF) filter. However, the equalizer group delay originating from the pole-zero pair(s) in the lower half of the complex frequency plan (i.e., along the negative imaginary axis) decreases with increasing frequency and, therefore, is useless for the equalization process and, in fact, counteracts the equalization process.

2. The Office Action does not establish a *prima facie* case of obviousness because the Office Action does not address the actual language of the claim.

The rejection of claim 1 is improper because the Office Action does not establish a *prima facie* rejection for the claim. In order to establish a *prima facie* rejection of a claim under 35 U.S.C. 103, the Office Action must present a clear articulation of the reason why the claimed invention would have been obvious. MPEP 2142 (citing *KSR International Co. v. Teleflex Inc.*, 550 U.S. __ (2007)). The analysis must be made explicit. *Id.* Additionally, rejections based on obviousness cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *Id.*

Claim 1 recites “one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane” (emphasis added). Here, the Office Action fails to explain why the limitations of claim 1 would have been obvious because the Office Action does not assert that the cited references might teach the actual language of the claim. The Office Action acknowledges that Hajimiri does not teach the indicated limitation, and the Office Action does not assert that Chappell might teach the indicated limitation. Rather, the Office Action merely asserts that Cheung purportedly teaches a transfer function with only one or more pole-zero pairs alongside of a positive imaginary axis of a complex frequency plane. However, this assertion does not address the actual language of the claim because this assertion merely states that Cheung purportedly teaches only one or more pole-zero pairs alongside of a positive imaginary axis of a complex frequency plane. However, the claim does not recite only one or more pole-zero pairs alongside of a positive imaginary axis of a complex frequency plane. Rather, the claim recites one or more pole-zero pairs alongside of only a positive imaginary axis of a complex frequency plane. In other words, the term “only” modifies the “positive imaginary axis” recited in the claim, but does not modify the “one or more pole-zero pairs.” It appears that the analysis in the Office Action relies on arguments which address previous claim language. However, the current language of the claim is different from the previous claim language because the current claim language refers to “only the positive imaginary axis.”

Therefore, the Office Action fails to acknowledge that claim 1 specifically recites “one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane” (emphasis added). In fact, the Office Action does not even make an assertion that the cited references might describe the indicated limitation, or that the indicated limitation might otherwise be obvious in light of the cited references.

Since claim 1 recites a specific limitation that is not addressed in the reasoning asserted in the Office Action, the Office Action fails to establish a *prima facie* rejection for claim 1. Accordingly, Applicants respectfully submit that the rejection of claim 1 under 35 U.S.C. 103(a) should be withdrawn because the Office Action fails to establish a *prima facie* rejection.

3. The rejection is improper because Cheung does not teach one or more pole-zero pairs alongside of only the positive imaginary axis of the complex frequency plane.

Even if the Office Action were to assert that Cheung might teach the actual language of the claim, the rejection of claim 1 is nevertheless improper because Cheung does not teach one or more pole-zero pairs alongside of only the positive imaginary axis of a complex frequency plane and shifted along the positive imaginary axis off of the real axis.

As explained in Applicants’ previous response, Cheung merely depicts two representations of pole-zero pairs in a complex frequency plane. The pole-zero pair shown in Fig. 4A is located on the real axis and, therefore, is not shifted along the positive imaginary axis off of the real axis. The pole-zero pairs shown in Fig. 4B are located both above (i.e., along the positive imaginary axis) and below the real axis and (i.e., along the negative imaginary axis). Therefore, the pole-zero pairs shown in Fig. 4B are not located alongside of only the positive imaginary axis of the complex frequency plane.

Since neither of these pole-zero pairs depicted in the illustrations of Cheung satisfies the conditions of the limitations recited in claim 1, the proposed combination of references does not teach all the limitations of the claim because Cheung does not teach pole-zero pairs alongside of only the positive imaginary axis and shifted along the

positive imaginary axis off of the real axis. Accordingly, Applicants respectfully submit that claim 1 is patentable over the cited combination of Hajimiri, Cheung, and Chappell at least because the combination of cited references does not teach pole-zero pairs alongside of only the positive imaginary axis and shifted along the positive imaginary axis off of the real axis.

Dependent Claims 2-5

Claims 2-5 depend from and incorporate all of the limitations of independent claim 1. Applicants respectfully assert claims 2-5 are allowable based on an allowable base claim. Additionally, each of claims 2-5 may be allowable for further reasons, as described below.

In regard to claims 4 and 5, Applicants respectfully submit that the reasoning presented in the present Office Action does not present a clear articulation of the reason why the claimed invention would have purportedly been obvious. In order to establish a *prima facie* rejection of a claim under 35 U.S.C. 103, the Office Action must present a clear articulation of the reason why the claimed invention would have been obvious. MPEP 2142 (citing *KSR International Co. v. Teleflex Inc.*, 550 U.S. __ (2007)). Thus, an Office Action which does not present a clear articulation of the reasons why a claimed invention would have been obvious fails to establish a *prima facie* rejection under 35 U.S.C. 103.

Here, the Examiner appears to conclude that using cascaded equalizers having the same or different components would allow an implementation to take advantage of different delay responses and to obtain a desired pole-zero pattern. Office Action, 1/17/08, page 6, last full paragraph of section 3. Applicants respectfully note that this appears to be the most reasonable interpretation of the language provided in the Office Action, given the many disparate ideas which are included in the only sentence of the paragraph. With this understanding of the arguments presented in the Office Action, Applicants respectfully submit that the Examiner's remarks fail to address the actual limitations of claims. In particular, this reasoning does not address how the cited references might teach a cascade of group delay equalizer's with different pole-zero patterns, as recited in claim 4. Similarly, the reasoning does not address how the cited

references might teach a cascade of group delay equalizer's with the same pole-zero patterns, as recited in claim 5.

Moreover, the reasoning in the Office Action, as understood by Applicants, merely asserts that desired pole-zero patterns may be obtainable. The statement that "same or different for the cascaded equalizers in order to take advantage of different delay response of cascaded equalizers to compensate over a required frequency spectrum" does not add anything to address the limitations of implementing equalizers with the same or different pole-zero patterns. In fact, it is not clear that the indicated statement from the Office Action is even directed to pole-zero patterns, since the statement appears to be directed to implementing the same or different cascaded equalizers, generally, in order to obtain particular pole-zero patterns.

In any case, Applicants respectfully submit that the language provided in the Office Action does not present a clear articulation of the reason why the individual limitations of claims 4 and 5 might have been obvious, in light of the claim language as a whole. Therefore, the Office Action does not establish *prima facie* rejections of claims 4 and 5 because the Office Action does not present a clear articulation of the reasons why the limitations of the claims might have been obvious. Accordingly, Applicants respectfully request that the rejections of claim 4 and 5 under 35 U.S.C. 103(a) be withdrawn because the Office Action does not establish *prima facie* rejections of claims 4 and 5.

CONCLUSION

Applicants respectfully request reconsideration of the claims in view of the amendments and the remarks made herein. A notice of allowance is earnestly solicited.

At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account **50-4019** pursuant to 37 C.F.R. 1.25. Additionally, please charge any fees to Deposit Account **50-4019** under 37 C.F.R. 1.16, 1.17, 1.19, 1.20 and 1.21.

Respectfully submitted,

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